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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/915,160	07/25/2001	Toshiharu Yanagida	09792909-5171	7228

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EXAMINER

IM, JUNGHWA M

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/915,160

Applicant(s)

YANAGIDA, TOSHIHARU

Examiner

Junghwa M. Im

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 7-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/385,959.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of claims 1-6 in Paper No. 5 is acknowledged.

### *Claim Objections*

Claims 2-6 are objected to because of the following informalities.

Claims 2-6 recite starting with "a" semiconductor which should be "the" semiconductor.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 6 recites a resin film "becomes" thinner. Does it mean that the resin film is thicker in other region and becomes thinner? Or, was the resin film formed thicker previously?

Claim 2, line 4 recites a word, "inviting" which does not precisely describe the limitation.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (U.S.6,333,206) in view of Nishikawa et al. (U.S. Pat. 5,878,943).

Regarding claim 1, Ito et al. disclose in Fig.28, a semiconductor apparatus comprising:  
metal bumps(2) formed so as to connect to a circuit pattern(1) of a semiconductor device  
and

a resin film(10) formed on a circuit pattern forming surface of said semiconductor device  
so as to seal spaces between the metal bumps and become thinner than the height of the metal  
bump.

Ito et al. do not explicitly show the projecting metal bumps being cleaned.

However, Nishikawa et al. teach in Fig.18 the surfaces of the metal bumps being cleaned  
(col.12, lines 18-25)

It would have been obvious to one of ordinary skill in the art at the time of the invention  
to incorporate the teaching of Nishikawa et al. to the device of Ito et al. in order to enhance the  
strength of the soldered junction through having a clean surface of metal bumps.

Regarding claim 2, Nishikawa et al. teach the surfaces of the metal bumps being cleaned  
of components inviting a rise of a connection resistance and a drop in a joint strength at least  
connection interfaces. Nishikawa et al. teach, throughout the specification, cleaning method of  
oxide/contamination coating on the surface of metal bumps to enhance better alignment between  
the soldering joint.

***Claim Rejections - 35 USC § 103***

Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. and Nishikawa et al. as applied to claims 1 and 2 above, and further in view of Acocella et al. (U.S. Pat. No. 5,591,941).

Ito et al. and Nishikawa et al. teach most aspect of pending claim except the specified solder components.

Acocella et al. show a device with a metal bump comprising high melting point solder and of eutectic solder (Abstract)

Also see the respective portions of the specification such as col. 5, lines 20-59.

It would have been obvious to one of ordinary skill in the art at the time of the invention to come the teaching of Acocella et al. with the device of Ito et al. and Nishikawa et al. in order to provide reliable bonding between the package and circuit board through use of high melting solder together with eutectic solder.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (703) 305-3998. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Application/Control Number: 09/915,160

Art Unit: 2811

Page 5

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JMI

November 2, 2002

*Sara W Crane*  
Sara Crane  
Primary Examiner